



Department of Energy  
Carlsbad Field Office  
P. O. Box 3090  
Carlsbad, New Mexico 88221

JUN 25 2004



Mr. Steve Zappe, WIPP Project Leader  
Hazardous Waste Permits Program  
Hazardous and Radioactive Materials Bureau  
New Mexico Environment Department  
2905 E. Rodeo Park Drive, Bldg. 1  
Santa Fe, NM 87505

Subject: Transmittal of Approved Change Notice Number 4 for Rocky Flats  
Environmental Technology Site Waste Stream Profile Form Number  
RF002.01 TRU Metal Debris Waste.

Dear Mr. Zappe:

The Carlsbad Field Office (CBFO) has approved the change notice number 4 for Rocky Flats Environmental Technology Site (RFETS), Waste Stream Profile Form RF002.01. Enclosed is a copy of the approved form as required by Section B-4(b)(1) of the WIPP Hazardous Waste Facility Permit No. NM4890139088-TSDF.

If you have any questions on this matter, please contact me at (505) 234-7357 or (505) 706-0066.

Sincerely,

Kerry W. Watson  
CBFO Assistant Manager  
Office of National TRU Program

Enclosure

cc: w/o enclosure  
J. Kieling, NMED  
C. Walker, TechLaw  
M. Strum, WTS \*ED  
R. Chavez, WRES \*ED  
L. Greene, WRES \*ED  
S. Calvert, CTAC \*ED  
CBFO M&RC

\*ED denotes Electronic Distribution

## **Update for WIPP Operating Record (Change Notice #4)**

### **TRU Metal Debris Waste (RF002.01)**

Please add the following information to the WIPP Operating Record for: WSPF # RF002.01, Revision 3 as amended by WIPP operating record updates dated November 6, 2002, February 12, 2003 and April 30, 2003. This waste stream is TRU Metal Debris Wastes and was approved by DOE/CBFO on March 9, 2000. Please update related files as you deem appropriate.

The Waste Stream Profile Form (WSPF) is being revised. The WSPF components are bolded. The updates are:

1. **Number of Drums:** Change to 2015
2. **Number of SWBs:** Change to 518

The Acceptable Knowledge (AK) Summary attachment to the WSPF is being revised. The AK Summary components are bolded. The updates are:

1. **Waste Stream Volume (Retrievably Stored):** Revised category to specify 1320 55-gallon drums and 208 SWBs with dates of December 1982 - September 2001.
2. **Waste Stream Volume (Newly Generated):** Added category to specify 681 55-gallon drums and 306 SWBs with dates of October 2001 - May 2004.
3. **Waste Stream Volume (Projected):** Revised to specified 14 drums and 4 SWBs with dates of May 2004 - October 2004.

**TRU Metal Debris Waste:** Added sentence about PK for flammable VOCs as follows: Process knowledge demonstrates flammable VOCs in headspace <500 ppm: Yes.

#### **Generating Processes:**

- Deleted table and changed first paragraph to read: Metal wastes have been generated by nearly every operation on site. A detailed description of the waste generating processes and their process flow diagrams can be found in the WSRIC Building Books or archived WSRIC files.

#### **RCRA Characterization:**

- Deleted table and changed first paragraph to read: This waste stream is NOT a mixed waste. The waste is generated from similar activities; is similar in material, physical form, and hazardous constituents; and is, therefore, considered a single waste stream. The specific BWR Baseline Book Subpopulations and WSRIC Process Numbers associated with the TRU Metal Debris waste stream are listed in the WEMS AK Waste Stream Summary for Profile Number RF002.01.<sup>(6)</sup>
- Paragraph added to indicate screening for prohibited items:

Visual examination of waste contents at the time of packaging and/or RTR is used to verify that the waste stream does not contain liquid waste, explosives, non- radionuclide pyrophoric materials, compressed gasses, or reactive waste. Therefore, this waste stream does not exhibit the characteristics of ignitability (D001), corrosivity (D002), or reactivity (D003).

- Indicate why no P015-listed waste even though beryllium was used at RFETS:

Beryllium parts were used in the manufacture/assembly of weapons components, and residual beryllium contamination of plutonium parts may have occurred. Any beryllium present on these parts is as a contaminant of the process and not as unused commercial chemical product, and therefore is

not a P015-listed waste. This waste stream includes beryllium metal waste (IDCs 489, Classified Be Scrap Metal Shapes, and 854, Beryllium Metal). Based on an evaluation of this waste and the processes that generated the waste, including chemical usage, this waste stream does not exhibit the characteristic of toxicity and was not mixed with any another listed waste.

**Added Transportation paragraph as follows:**

The payload containers in the waste stream must also comply with the TRUPACT-II Authorized Methods for Payload Control (TRAMPAC) requirements. Flammable volatile organic compounds (VOCs) were not identified in this waste stream based on the descriptions in the BWR Baseline Book and WSRIC Building Books, and headspace gas sampling and analysis. Therefore, flammable VOCs in the payload container headspace do not exceed 500 ppm.

**Reason/Justification for Change:**

Original profile did not incorporate the projected waste generation (4,465 m<sup>3</sup>) listed in the Revision 7 AK summary submitted with the original profile. Subsequent updates for classified IDCs, beryllium, etc., added only those specific containers and did not address the original profile underestimate. This update addresses the retrievably stored, newly generated, and projected inventory.

Other updates (e.g., sentence about single waste stream; paragraphs about screening for prohibited items, beryllium; addition of the transportation paragraph) were made to comply with current procedural requirements for preparation of AK Summaries and to make the document compositionally consistent with current AK Summaries prepared for recently approved waste streams.

**Update for WIPP Operating Record (WSPF RF002.01) certification:**

I hereby certify that I have reviewed the information in this Update for WIPP Operating Record, and it is complete and accurate to the best of my knowledge. I understand that this information will be made available to regulatory agencies and that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

  
Signature of Site Project Manager

G. A. O'Leary, Manager TRU Programs  
Printed Name and Title

6-22-04  
Date



**Department of Energy**

Carlsbad Area Office  
P. O. Box 3090  
Carlsbad, New Mexico 88221

March 9, 2000

John Kieling, Manager  
Hazardous Waste Permits Program  
Hazardous and Radioactive Materials Bureau  
New Mexico Environment Department  
P.O. Box 26110  
Santa Fe, New Mexico 87502-6110

Subject: TRANSMITTAL OF APPROVED WASTE STREAM PROFILE FORM FOR  
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE; WASTE  
STREAM RF002.01

Dear Mr. Kieling:

The Department of Energy, Carlsbad Area Office has approved the Rocky Flats Environmental Technology Site Waste Stream Profile Form for Waste Stream RF002.01, Rev. 3. Enclosed is a copy of the approved form as required by Section B-4(b)(1) of the WIPP's Hazardous Waste Permit No. NM4890139088--TSDf.

Please contact Mr. Jim Klaus at (505) 234-7350 should you have any questions regarding this approval.

Sincerely,

Dr. Inés R. Triay  
Manager

cc:

S. Zappe, NMED  
E. Rose, CAO  
B. Stroud, CAO  
C. Zvonar, CAO  
C. Walker, TechLaw  
G. Barnes, WID  
J. Epstein, WID  
K. Mikus, WID (Operating Record)  
L. Steven, WID  
M. Whatley, WID

**MAIL ROOM COPY**

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# WIPP WASTE STREAM PROFILE FORM

RF002.01, Revision 3

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Waste Stream Profile Number: RF002.01

Generator site name: RFETS

Technical contact: Eric D'Amico

Generator site EPA ID: CO7890010526

Phone number: (303) 966-5362

Date site certified by CAO: March 9, 2000

Title, version number, and date of documents used for WAC certification: Rocky Flats Environmental Technology Site TRU Waste Characterization Program Quality Assurance Project Plan, Revision 4, 95-QAPIP-0050, December 1999, Transuranic (TRU) Waste Management Manual, Revision 3, 1-MAN-008-WM-001, December 1999, WIPP Waste Acceptance Criteria, DOE/WIPP-069, Revision 7, DOE/WIPP-069, November 1999.

Did your facility generate this waste? ☒ Yes ☐ No If no, provide the name and EPA ID of the original generator:

## Waste Stream Information (1)

WIPP ID [WTWBIR ID (HQ ID)]: RF-TT0320 (RF-W111), RF-TT0479 (RF-W109), RF-TT0480 (RF-W109), RF-TT0481 (RF-W109), RF-TR0320 (RF-W111), RF-TR0479 (RF-W109), RF-TR0480 (RF-W109)

Summary Category Group: S5000 Waste Matrix Code Group: Uncategorized Metal

Waste Stream Name: Metal/TRU and Heavy Metal (non-SS)/TRU

Description from the WTWBIR: Includes items such as gloveboxes, machinery, and empty containers. IDC 320 consists of tantalum, tungsten, and platinum scrap such as crucibles, funnels, rods, and fixtures.

Defense TRU Waste: ☒ Yes ☐ No Check one: ☒ CH ☐ RH

Number of SWBs 194 Number of Drums 922 Number of Canisters N/A

Data package numbers supporting this waste stream characterization: See Table 7.

List applicable EPA Hazardous Waste Codes(2): None

Applicable TRUCON Content Codes: RF 117A, RF 117B, RF 117C, RF 117D, RF 117E, RF 117F, RF 117N

## Acceptable Knowledge Information(1)

[For the following, enter supporting the documentation used (i.e., references and dates)]

### Required Program Information

- Map of site: Reference List, No. 3
- Facility mission description: Reference List, No. 3
- Description of operations that generate waste: Reference List, Nos. 1, 2, 3, 6
- Waste identification/categorization schemes: Reference List, Nos. 11, 12
- Types and quantities of waste generated: Reference List, Nos. 1, 2, 3
- Correlation of waste streams generated from the same building and process, as appropriate: Reference List, Nos. 1, 2, 6
- Waste certification procedures: Reference List, No. 5

### Required Waste Stream Information

- Area(s) and building(s) from which the waste stream was generated: Reference List, Nos. 1, 2, 6
- Waste stream volume and time period of generation: Reference List, Nos. 4, 6
- Waste generating process description for each building: Reference List, Nos. 1, 2, 6
- Process flow diagrams: Reference List, Nos. 1, 2
- Material inputs or other information identifying chemical/radionuclide content and physical waste form: Reference List, Nos. 1, 2, 3, 6
- Which Defense Activity generated the waste: (Check one) Reference List, No. 3
  - ☒ Weapons activities including defense inertial confinement fusion
  - ☐ Naval Reactors development
  - ☐ Verification and control technology
  - ☐ Defense research and development
  - ☐ Defense nuclear waste and material by products management
  - ☐ Defense nuclear materials production
  - ☐ Defense nuclear waste and materials security and safeguards and security investigations

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Supplemental Documentation

- Process design documents: N/A
- Standard operating procedures: N/A
- Safety Analysis Reports: N/A
- Waste packaging logs: N/A
- Test plans/research project reports: N/A
- Site data bases: N/A
- Information from site personnel: N/A
- Standard industry documents: N/A
- Previous analytical data: N/A
- Material safety data sheets: N/A
- Sampling and analysis data from comparable/surrogate Waste: N/A
- Laboratory notebooks: N/A

Sampling and Analysis Information(1)

[For the following, when applicable, enter procedure title(s), number(s) and date(s)]

- ☒ Radiography: Reference List, Nos. 8, 9
- ☒ Visual Examination: Reference List, No. 7
- ☒ Headspace Gas Analysis
  - VOCs: Reference List, No. 10
  - Flammable: Reference List, No. 10
  - Other gases (specify): N/A
- ☐ Homogeneous Solids/Soils/Gravel Sample Analysis (Tables 1, 3, 4, and 5 are not applicable and not included)
  - Total metals: N/A
  - PCBs: N/A
  - VOCs: N/A
  - Nonhalogenated VOCs: N/A
  - Semi-VOCs: N/A
  - Other (specify): N/A

Waste Stream Profile Form certification:

I hereby certify that I have reviewed the information in this Waste Stream Profile Form, and it is complete and accurate to the best of my knowledge. I understand that this information will be made available to regulatory agencies and that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

[Signature]  
Signature of Site Project Manager

G. A. O'Leary  
Printed Name and Title

3/9/00  
Date

- NOTE** (1) Use back of sheet or continuation sheets, if required.
- (2) If radiography, visual examination, headspace gas analysis, and/or homogeneous solids/soils/gravel sample analysis were used to determine EPA Hazardous Waste Codes, attach signed summary reports documenting this determination.

# WIPP WASTE STREAM PROFILE FORM

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## REFERENCE LIST

1. Backlog Waste Reassessment Baseline Book, Waste Form 24, Metal, May 1999, and Waste Form 25, Heavy Metal, January 1999.
2. Waste Stream and Residue Identification and Characterization (WSRIC), Revision 6, and archived versions.
3. RFETS TRU Waste Acceptable Knowledge Supplemental Information, RF/RMRS-97-018, Revision 6, November 1999.
4. Waste and Environmental Management System (WEMS) database.
5. Transuranic Waste Certification, 1-PRO-X05-WC-4018, Revision 0, May 1997.
6. Acceptable Knowledge TRU/TRM Waste Stream Summaries, RMRS-WIPP-98-100, Revision 6, December 1999.
7. Visual Examination for the TRU Waste Characterization Program, 4-H80-776-ASRF-007, Revision 2, December 1999.
8. Real-Time Radiography Testing of Transuranic and Low-Level Waste, 4-W30-NDT-00664, Revision 2, November 1999.
9. Real-Time Radiography Testing of Transuranic and Low-Level Waste in Building 569, 4-I19-NDT-00569, Revision 3, November 1999.
10. GC/MS Determination of Volatile Organics Waste Characterization, L-4111-Q, November 1999.
11. Waste Characterization, Generation, and Packaging, 1-PRO-079-WGI-001, Revision 0, November 1997.
12. Waste Characterization Program Manual, 1-MAN-036-EWQA-Section 1.6.1, Revision 1, December 1999.

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## Form A Reconciliation with Data Quality Objectives

I certify by signature (below) that sufficient data have been collected to determine the following Program-required waste parameters:

WSPF # RF002.01

Item	Check Box <sup>a</sup>	Reconciliation Parameter
1	✓	Waste Matrix Code as reported in WEMS.
2	✓	Waste Material Parameter Weights for individual containers as reported in WEMS.
3	✓	The waste matrix code identified is consistent with the type of sampling and analysis used to characterize the waste.
4	✓	Container mass and activities of each radionuclide of concern as reported in WEMS.
5	✓	Each waste container of waste contains TRU radioactive waste.
6	✓	Mean concentrations, UCL <sub>90</sub> for the mean concentrations, standard deviations, and the number of samples collected for each VOC in the headspace gas of waste containers in the waste stream/waste stream lot.
7	N/A	Mean concentrations, UCL <sub>90</sub> for the mean concentrations, standard deviations, and number of samples collected for VOCs in the waste stream/waste stream lot. Summary Categories S3000 and S4000.
8	N/A	Mean concentrations, UCL <sub>90</sub> for the mean concentrations, standard deviations, number of samples collected for SVOCs in the waste stream/waste stream lot. Summary Categories S3000 and S4000.
9	N/A	Mean concentrations, UCL <sub>90</sub> for the mean concentrations, standard deviations, and number of samples collected for metals in the waste stream/waste stream lot. Summary Categories S3000 and S4000.
10	N/A	Sufficient number of samples was taken to meet statistical sampling requirements.
11	✓	Only validated data were used in the above calculations, as documented through the site data review and validation forms and process.
12	✓ <sup>b</sup>	Waste containers were selected randomly for sampling, as documented in site procedures.
13	✓	The potential flammability of TRU waste headspace gases.
14	✓ <sup>b</sup>	Sufficient number of waste containers was visually examined to determine with a reasonable level of certainty that the UCL <sub>90</sub> for the misclassification rate is less than 14 percent.
15	✓	Whether the waste stream exhibits a toxicity characteristic (TC) under 40 CFR Part 261, Subpart C.
16	✓	All TICs were appropriately identified and reported in accordance with the requirements of the WAP prior to submittal of a waste stream profile form for a waste stream or waste stream lot.
17	✓	The overall completeness, comparability, and representativeness QAOs were met for each of the analytical and testing procedures as specified in the WAP Sections B3-2 through B3-9 prior to submittal of a waste stream profile form for a waste stream or waste stream lot.
18	✓	The RTLs (i.e., PRQLs) for all analyses were met prior to submittal of a waste stream profile form for a waste stream or waste stream lot.
19	✓	Whether the waste stream can be classified as hazardous or non-hazardous at the 90-percent confidence limit.

<sup>a</sup> Check (✓) indicates that data or acceptable knowledge are sufficient to determine the waste parameters and that the waste parameters have been reported in the listed document or database. N/A indicates parameter does not apply to waste stream. NO indicates data are insufficient.

<sup>b</sup> All containers used to profile this waste stream were visually examined.

Signature of Site Project Manager

G. A. O'Leary  
Printed Name

Date



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Data Summary Report—Table 2: Headspace Gas Summary Data

WSPF # RF002.01

2A

ANALYTE	# Samples <sup>c</sup>	Maximum (ppmv)	Mean (ppmv)	SD (ppmv)	UCL <sub>90</sub> (ppmv)	RTL <sup>d</sup> (ppmv)	EPA Code <sup>a</sup>
1,1-Dichloroethane						NA	
1,2-Dichloroethane						10	
1,1-Dichloroethylene						10	
cis-1,2-Dichloroethylene						NA	
1,1,2,2-Tetrachloroethane						10	
1,1,1-Trichloroethane						10	
1,1,2-Trichloro-1,2,2-Trifluoroethane						10	
Acetone	12	10.6	2.85	2.94	3.61	100	
Benzene	1	1.3	0.19	0.22	0.25	10	
Bromoform						NA	
Butanol						100	
Carbon disulfide						10	
Carbon tetrachloride						10	
Chlorobenzene						10	
Chloroform						10	
Ethyl benzene	2	1.0	0.19	0.18	0.24	10	
Ethyl ether						100	
Methanol	2	25.8	5.6	4.5	6.77	100	
Methyl ethyl ketone	6	6.3	1.58	1.52	1.97	100	
Methyl isobutyl ketone						100	
Methylene chloride	1	0.7	0.17	0.11	0.19	10	
o-Xylene	2	0.9	0.19	0.18	0.24	10	
m/p-Xylene	2	3.6	0.35	0.74	0.54	10	
Tetrachloroethylene						10	
Toluene	20	30.7	5.8	7.6	7.80	72.02 <sup>e</sup>	
Trichloroethylene						10	

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**Data Summary Report—Table 2: Headspace Gas Summary Data (continued)**

**WSPF # RF002.01**

**2B**

TENTATIVELY IDENTIFIED COMPOUND	Maximum Observed Estimated Concentrations (ppmv) <sup>c</sup>	# Samples Containing TIC <sup>c</sup>
No TICs included in the 40 CFR 261 Appendix VIII list were detected in at least 25 percent of headspace gas samples for the waste stream lot.		

Did the data verify the acceptable knowledge? ☒ Yes   ☐ No

If not, describe the basis for assigning the EPA Hazardous Waste Codes:

**NOTES:**

- <sup>a</sup> No entry indicates no associated EPA Code assigned to the waste stream.
- <sup>b</sup> No entry indicates no additional target analytes.
- <sup>c</sup> No entry indicates no detectable measurements available for statistics. The number entered in this column identifies the number of samples with a detectable result for the associated analyte. In these cases, statistics were performed using all the as-reported detectable results and one-half the reported method detection limit (MDL) for the remaining results identified as not detected. A total of twenty-six (26) field samples were collected and analyzed for this profile form.
- <sup>d</sup> RTLs for headspace gas analysis results correspond to the analyte PRQL for analytes that are hazardous waste constituents. "NA" means the analyte is not a hazardous waste constituent and so has no associated regulatory threshold.
- <sup>e</sup> Limit used for evaluating EPA Hazardous Waste Code for toluene (Reference No. 3).

**WIPP WASTE STREAM PROFILE FORM  
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**Data Summary Report—Table 6: Exclusion of  
Prohibited Items****WSPF # RF002.01**

The absence of prohibited items is documented through acceptable knowledge. The absence of free liquids, indicating no corrosive, ignitable or reactive waste, and the absence of pressurized containers has been verified by radiography or visual examination of each container in this waste stream or waste stream lot.

# WIPP WASTE STREAM PROFILE FORM ATTACHMENTS

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**Data Summary Report—Table 7: Correlation  
of Container Identification to Data Packages**

WSPF # RF002.01

Drum No.	Headspace Sample Batch No.	Headspace VOC Data Package	VE Data Package	Radioassay Data Package	RTR Data Package
D19003	00C0462	HVOC-DP-00236	VE-2000-005	CIQ-98-012	6T1598
D57847	00C1045	HVOC-DP-00237	VE-2000-006	CIQ-98-015	6T1598
D64483	00C1046	HVOC-DP-00238	VE-2000-006	CIQ-98-010	6T1601
D64975	00C0462	HVOC-DP-00236	VE-2000-006	CPN-98-003	6T1598
D65226	00C1045	HVOC-DP-00237	VE-2000-004	CIQ-98-009	6T1598
D65678	00C0462	HVOC-DP-00236	VE-2000-006	CIQ-98-026	6T1598
D66214	00C1046	HVOC-DP-00238	VE-2000-005	CIQ-98-005	6T1601
D68384	00C0462	HVOC-DP-00236	VE-2000-005	CIQ-98-013	6T1598
D68691	00C0462	HVOC-DP-00236	VE-2000-005	CIQ-98-009	6T1598
D69007	00C1047	HVOC-DP-00239	VE-2000-006	CIQ-98-027	6T1601
D69086	00C0462	HVOC-DP-00236	VE-2000-005	CIQ-98-009	6T1598
D70380	00C1045	HVOC-DP-00237	VE-2000-006	CIQ-98-018	6T1598
D72026	00C1045	HVOC-DP-00237	VE-2000-006	CIQ-98-009	6T1598
D73365	00C1046	HVOC-DP-00238	VE-2000-006	CIQ-98-007	6T1601
D74729	00C1045	HVOC-DP-00237	VE-2000-005	CIQ-98-026	6T1598
D74778	00C1046	HVOC-DP-00238	VE-2000-005	CIQ-98-006	6T1601
D75604	00C1046	HVOC-DP-00238	VE-2000-005	CIQ-98-011	6T1601
D76814	00C1046	HVOC-DP-00238	VE-2000-005	CIQ-98-010	6T1601
D76909	00C1045	HVOC-DP-00237	VE-2000-006	CIQ-98-012	6T1598
D80680	00C1047	HVOC-DP-00239	VE-2000-006	CIQ-98-007	6T1601
D82192	00C1046	HVOC-DP-00238	VE-2000-006	CIQ-98-013	6T1601
D83403	00C1047	HVOC-DP-00239	VE-2000-006	CIQ-98-007	6T1601
D86071	00C1046	HVOC-DP-00238	VE-2000-006	CPN-98-006	6T1601
D86943	00C1046	HVOC-DP-00238	VE-2000-006	CIQ-98-008	6T1601
D92587	00C0461	HVOC-DP-00235	VE-2000-005	CIQ-99-017	5T0103
D92927	00C0461	HVOC-DP-00235	VE-2000-003	CPN-99-007	5T0103

5.3 TRU Metal Debris Waste

Profile No. RF002.01

**Acceptable Knowledge Waste Stream Summary**

Waste Stream: Metal Wastes, RF-197, RF-320b, RF-480i, RF-824

Generation Buildings: Buildings 371, 374, 559, 707, 771, 776, 777, 779, 881, 886, and 991<sup>(6,7)</sup>

Waste Stream Volume (Current): 922 55-Gallon Drums and 194 Standard Waste Boxes<sup>(6,7)</sup>

Generation Dates (Current): December 1981 – October 1999<sup>(6,7)</sup>

Waste Stream Volume (Projected): 4,465 m<sup>3</sup> (55-gallon drums and Standard Waste Boxes)<sup>(7,8,9)</sup>

Generation Dates (Projected): November 1 – September 2005<sup>(8,9)</sup>

TRUCON Content Codes <sup>(1)</sup>: RF 117A, RF 117B, RF 117C, RF 117D, RF 117E, RF 117F  
RF117N

**Transuranic Waste Baseline Inventory Report Information <sup>(2)</sup>**

WIPP Identification Numbers: RF-TT0320, RF-TT0479, RF-TT0480, RF-TT0481, RF-TR0320,  
RF-TR0479, RF-TR0480

Summary Category Group: S5000 Waste Matrix Code Group: Uncategorized Metal

Waste Matrix Code: S5111 and S5119 (IDC 320 only)

Waste Stream Name: Metal/TRU and Heavy Metal (non-SS)/TRU

Description from the TWBIR: Includes items such as gloveboxes, machinery, and empty  
containers. IDC 320 consists of tantalum, tungsten, and platinum scrap such as crucibles,  
funnels, rods, and fixtures.

**Waste Stream Description**

TRU metals consists of tantalum targets and subtargets (IDC 197), heavy non-special source (SS) metal (IDC 320), empty reusable cans (IDC 479), light metal (IDC 480), and light non-SS metal (unclassified) (IDC 481). The following table presents the waste matrix codes and waste material parameters for metal wastes.<sup>(3)</sup>

IDC	IDC Description	Waste Matrix Code	Waste Material Parameters	Weight % (Average)
197	Ta Target and Subtarget, To Be Leached	S5111, Metal Debris w/o Pb or Cd	Other Metal/s/Alloys	100%
320	Heavy non-SS Metal	S5111, Metal Debris w/o Pb or Cd	Other Metal/s/Alloys	100%
479	Empty Cans	S5111, Metal Debris w/o Pb or Cd	Iron-based Metal/Alloys	100%
480	Light Metal	S5111, Metal Debris w/o Pb or Cd	Iron-based Metal/Alloys	93%
824			Cellulosics (fiberboard liner) <sup>1</sup>	3%
			Plastics (liners) <sup>2</sup>	3%
			Aluminum-based Metal/Alloys	1%
481	Light non-SS Metal (unclassified)	S5111, Metal Debris w/o Pb or Cd	Iron-based Metal/Alloys	93%
			Cellulosics (fiberboard liner)	3%
			Plastics (liners)	3%
			Aluminum-based Metal/Alloys	1%

Notes:

1. The average weight percent of cellulosic materials is based on RTR and includes the fiberboard liner.
2. The average weight percent of plastic materials is based on RTR and includes plastic liner bags.

**IDC 197, Ta Target and Subtarget:** Tantalum targets and subtargets are tantalum substrates used for coating processes. The materials are size-reduced prior to being repackaged.<sup>(10)</sup>

**IDC 320, Heavy non-SS Metal:** Non-stainless steel metals that are heavier than iron. Examples of this waste include crucibles, funnels, rods, and process fixtures made primarily from tantalum, tungsten, and platinum. Since 1987, lead has been segregated from this waste as IDC 321.<sup>(4,5)</sup>

**IDC 479, Empty Reusable Cans:** Stainless-steel cans used to manually transfer plutonium-contaminated materials between gloveboxes. Cans were typically recycled and reused.<sup>(5)</sup> IDC may be changed to 480 when material declared as waste.

**IDC 480, Light Metal:** Iron, copper, aluminum, stainless steel, galvanized metal, carbon steel, brass, bronze, and other common alloys. Metal waste items may include mechanical and electrical parts, tools, containers, scrap metals, piping wire, cable, gauges, valves, foil, and planchets.<sup>(5) (5)</sup>

**IDC 481, Leached Light Metal:** This waste consists of light metal, primarily stainless-steel and aluminum equipment, that was rinsed to remove radioactive surface contamination. This IDC is no longer active and has been replaced by IDC 480.<sup>(5)</sup>

**IDC 824, Light Metal TRU Waste:** This IDC is assigned to light metal identified as being TRU waste. The metal types and waste items are the same as IDC 480.<sup>(5)</sup>

## Areas of Operation

TRU metal wastes have been generated by the following operations:

- Plutonium Production
- Plutonium Recovery and Purification
- Laboratory Operations
- Waste Treatment
- Research and Development
- Maintenance
- Residue Repackaging and Treatment
- Decontamination and Decommissioning Operations

## Generation Processes

Metal wastes have been generated by nearly every operation on site. The following table provides the title of each generating process along with the corresponding WSRIC building and process number. A description of each of these processes, process flow diagrams, and details of each metal waste stream can be found in the *WSRIC Building Books* or *archived WSRIC files*.

Building	Process	Title
<b>Building 371</b>		
371	1	DCHP Preparation
371	3	Repack Operations
371	4	Analytical Lab
371	5	Chemical Standards Laboratory
371	6	PROVE Vacuum System
371	7	Process Vent Scrubber
371	15	General Waste (RMMA)
371	18	Heating, Ventilation, & Air Conditioning
371	19	Caustic Waste Treatment System
371	21	Nitrate Contaminated Residue Treatment
371	22	Beryllium Parts Cleaning
371	23	Salt Residues Repack Project
<b>Building 374</b>		
374	1	Acid Neutralization
<b>Building 559</b>		
559	2	Dynamic Analysis
559	3	X-Ray Methods
559	4	Infrared Analysis
559	5	GC/MS Environmental Samples/RCRA Waste
559	6	Thermal Analysis
559	8	Miscellaneous Analyses
559	9	Isotopic Analysis
559	11	Nondestructive Analysis
559	12	Uranium Analysis

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Building	Process	Title
559	13	Gallium Analysis
559	14	Plutonium Assay
559	15	Carbon Analysis
559	16	Raschig Ring Analysis
559	21	Assay Of Uranium By Auto Titration
559	23	Sample Receiving
559	24	Sample Break In And Sample Cutting
559	25	Maintenance
559	28	ICP Spectroscopy
559	29	Atomic Absorption
559	30	General Waste
559	31	Extractions
559	33	GC Analysis--Production Support
559	34	GC Analysis--Production Support
559	35	Total Metals Digestion
559	36	Toxicity Characterization Leaching Procedure
559	37	Analysis Of Sulfides/Aqueous Solutions
559	38	Total And Amenable Cyanide Analysis
559	39	Analysis For Reactive Sulfides
559	40	Analysis For Reactive Cyanide
559	41	Sulfide Analysis
559	42	Cyanide Analysis
559	43	Mercury Analysis
559	44	Reactivity Characteristic Test of Pyrochemical Salts
559	45	Chromium (VI) Determination
559	48	Ion Chromatography
559	49	Radiochemical Operations
559	50	Particle Size Distribution
<b>Building 561</b>		
561	1	Filter Plenum Building
<b>Building 707</b>		
707	1	Module A
707	2	Module K/X-Y Retriever
707	3	Module J
707	4	Rolling/Forming, Module B
707	6	Machining--Module A
707	7	Machining--Module C
707	9	Machining--Module G
707	10	Electron Bombardment Brazing
707	11	Density Balance--Module B
707	12	Density Balance--Module C
707	16	Assembly--Superdry
707	17	Assembly - Welding and Cleaning
707	20	Inspection
707	21	Testing--Module H
707	23	Briquetting
707	26	Calibration Lab--Module D
707	28	Nuclear Material Handling And Packaging



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Building	Process	Title
707	30	Maintenance
707	32	Duct Remediation
707	33	General Waste
707	35	Module B Through H
707	36	Deactivation/Decon/Decommissioning (D3)
707	37	Idle Equipment
707	38	HEPA filter Media Testing
707	39	Salt Stabilization
707	40	Residue Vitrification Study
707	41	Dry Residue Repack
707	42	Ash Residue Stabilization/Repack
707	43	Salt Repack
<i>Building 771</i>		
771	1	High-Level Dissolution
771	2	Low-Level Dissolution
771	3	Cation Exchange
771	4	Anion Exchange
771	5	Feed Evaporation
771	6	Precipitation Feed Batching
771	7	Precipitation
771	8	Precipitation Filtrate Evaporation
771	9	Calcination
771	10	Hydrofluorination
771	11	Reduction And Button Breakout
771	12	Miscellaneous Residue Processing
771	13	Metal Burning
771	14	Crushing And Grinding
771	15	Spray Leach
771	16	Oralloy Leach
771	17	Oralloy (OY) Precipitation
771	18	Special Recovery Anion Exchange
771	19	Caustic Filtration
771	20	Fume Scrubber
771	21	Vacuum Systems
771	23	Radioactive Inorganic Laboratory
771	24	Chemical Standards Laboratory
771	25	Chemical Technology
771	26	Plutonium Metallurgy
771	27	Plenums
771	29	Maintenance
771	31	Raschig Ring Removal
771	32	Radiological Safety
771	35	General Building Waste (RMMA)
771	36	H-4 Support Vacuum Systems
771	39	Solution Processing
<i>Building 774</i>		
774	1	Neutralization
774	2	Basic Liquid Waste: First Stage

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Building	Process	Title
774	3	Basic Liquid Waste: Second Stage
774	4	Precipitation/filtration
774	10	Microwave
<i>Building 776/777</i>		
776	1	Pyrochemical Processing
776	3	Advanced Size Reduction Facility
776	5	Coating
776	6	Utilities
776	9	Maintenance--Pipe Shop
776	10	Maintenance--Sheet Metal Shop
776	11	Machine Shop
776	13	Supercompactor
776	14	General Building Waste
777	1	Special Weapons Projects
777	2	Disassembly
777	4	Briquetting
777	6	Super Dry
777	7	Machining
777	8	Density Balance
777	11	Inspection
777	12	Carbon tetrachloride System
777	13	Nuclear Assembly Technology
777	14	Trichloroethane Collection & Filtration
777	15	Calibration Laboratory
777	16	Coatings Laboratory
777	18	Plutonium Metallurgical Lab
777	20	Joining Pigma Welder
777	21	Joining CO2 Laser
777	23	General Building Waste
776_777	1	Advanced Size Reduction Facility
776_777	5	Supercompactor
776_777	6	General Building Waste
776_777	7	Nuclear Material Handling And Packaging
776_777	9	TCA Collection and Filtration
776_777	11	Carbon Tetrachloride System
<i>Building 779</i>		
779	2	Generic Residue Treatment Process Wastes
779	3	RTT-Direct Oxide Reduction
779	4	RTT-Molten Salt Extraction
779	8	RTT-Salt Recycle
779	9	Hydride-Hydride And Metal
779	10	Hydride-Hydride/Oxide
779	11	Hydride-Acid Leach
779	14	Physical Metallurgy
779	15	Non-Plutonium Physical Metallurgy
779	16	RTT-Plutonium Oxide Dissolution
779	17	RTT-Peroxide Precipitation
779	18	RTT-Residue Recovery Extraction

Building	Process	Title
779	21	RTT-Ion Exchange Resin Project
779	23	Pu Tech-Gas-Solid Kinetic Studies
779	25	Nondestructive Lab Testing & Metal Study
779	26	Surface Analysis Laboratory
779	27	Pu Tech-Microbalance Pu Reaction Studies
779	28	Utilities
779	37	D&D Programs
779	40	Deactivation
779	41	Ferrite Actinide TRTMT of TRU Mixed Oil
<b>Building 886</b>		
886	2	Maintenance
<b>Building 991</b>		
991	1	Building Operations
<b>D &amp; D</b>		
D&D	3	Low-Level & TRU, Nonhazardous Waste Streams

## RCRA Characterization

The following table presents the chemical constituent codes (CCC) and EPA Hazardous Waste Numbers associated with the BWR Subpopulations and WSRIC Waste Streams assigned to TRU metal waste containers. Supporting characterization information is provided in the *BWR Baseline Book*, *active WSRIC Building Books*, and *WSRIC archived files*.

IDC	BWR Subpopulation	WSRIC Waste Stream	RCRA CCC	Non-RCRA CCC	EPA Hazardous Waste Numbers
<b>Ta Targets and Subtargets</b>					
0197		707 - 41 - 1	00	00	None
<b>Heavy Non-SS Metal</b>					
0320		371 - 15 - 134	00	00	None
0320		371 - 15 - 135	00	00	None
0320		371 - 23 - 7	00	00	None
0320		707 - 1 - 37	00	00	None
0320		707 - 3 - 5	00	00	None
0320		707 - 39 - 9	00	00	None
0320		707 - 43 - 8	00	00	None
0320		776_777 - 6 - 138	00	00	None
0320		779 - 37 - 24	00	00	None
0320		779 - 40 - 87	00	00	None
0320		779 - 40 - 112	00	07	None
0320		D&D - 3 - 14	00	00	None
0320	25A		00	00	None
<b>Empty Reusable Cans</b>					
0479		707 - 41 - 15	00	00	None
0479	24A		00	00	None

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IDC	BWR Subpopulation	WSRIC Waste Stream	RCRA CCC	Non-RCRA CCC	EPA Hazardous Waste Numbers
<i>Light Metal</i>					
0480		371 - 3 - 6	00	00	None
0480		371 - 4 - 19	00	00	None
0480		371 - 5 - 6	00	0264	None
0480		371 - 6 - 3	00	00	None
0480		371 - 15 - 7	00	00	None
0480		371 - 15 - 33	00	00	None
0480		371 - 15 - 97	00	00	None
0480		371 - 19 - 12	00	00	None
0480		371 - 19 - 13	00	00	None
0480		371 - 19 - 15A	00	68	None
0480		371 - 20 - 18	00	70	None
0480		371 - 21 - 3	00	02	None
0480		371 - 21 - 8	00	00	None
0480		371 - 21 - 17	00	70	None
0480		371 - 22 - 3	00	07	None
0480		371 - 23 - 23	00	00	None
0480		374 - 1 - 11	00	00	None
0480		559 - 3 - 14	00	00	None
0480		559 - 4 - 27	00	00	None
0480		559 - 4 - 57	00	00	None
0480		559 - 5 - 20	00	00	None
0480		559 - 5 - 46	00	00	None
0480		559 - 6 - 14	00	00	None
0480		559 - 6 - 23	00	00	None
0480		559 - 8 - 54	00	00	None
0480		559 - 9 - 11	00	02	None
0480		559 - 9 - 31	00	00	None
0480		559 - 14 - 4	00	02	None
0480		559 - 16 - 21	00	00	None
0480		559 - 21 - 12	00	00	None
0480		559 - 24 - 8	00	00	None
0480		559 - 25 - 4	00	00	None
0480		559 - 25 - 19	00	00	None
0480		559 - 28 - 12	00	00	None
0480		559 - 30 - 38	00	00	None
0480		559 - 30 - 59	00	00	None
0480		559 - 31 - 35	00	00	None
0480		559 - 33 - 21	00	00	None
0480		559 - 41 - 39	00	00	None
0480		559 - 42 - 36	00	00	None
0480		559 - 43 - 10	00	00	None
0480		559 - 44 - 3	00	00	None
0480		559 - 45 - 5	00	00	None
0480		559 - 48 - 6	00	00	None

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IDC	BWR Subpopulation	WSRIC Waste Stream	RCRA CCC	Non-RCRA CCC	EPA Hazardous Waste Numbers
0480		559 - 49 - 7	00	00	None
0480		559 - 50 - 5	00	00	None
0480		561 - 1 - 15	00	00	None
0480		707 - 1 - 39	00	00	None
0480		707 - 1 - 69	00	00	None
0480		707 - 2 - 8	00	10	None
0480		707 - 2 - 36	00	00	None
0480		707 - 3 - 8	00	00	None
0480		707 - 4 - 8	00	00	None
0480		707 - 4 - 20	00	00	None
0480		707 - 7 - 17	00	32	None
0480		707 - 30 - 9	00	00	None
0480		707 - 30 - 45	00	70	None
0480		707 - 32 - 8	00	00	None
0480		707 - 33 - 8	00	00	None
0480		707 - 35 - 19	00	00	None
0480		707 - 36 - 19	00	00	None
0480		707 - 36 - 36	00	70	None
0480		707 - 37 - 1	00	00	None
0480		707 - 38 - 6	00	00	None
0480		707 - 39 - 10	00	00	None
0480		707 - 40 - 4	00	00	None
0480		707 - 41 - 16	00	00	None
0480		707 - 41 - 27	00	00	None
0480		707 - 41 - 29	00	00	None
0480		707 - 42 - 11	00	00	None
0480		707 - 43 - 9	00	00	None
0480		771 - 23 - 8	00	00	None
0480		771 - 25 - 9	00	00	None
0480		771 - 26 - 7	00	00	None
0480		771 - 27 - 4	00	00	None
0480		771 - 29 - 5	00	32	None
0480		771 - 29 - 25	00	00	None
0480		771 - 31 - 4	00	00	None
0480		771 - 35 - 4	00	00	None
0480		771 - 35 - 12	00	00	None
0480		771 - 35 - 40	00	00	None
0480		771 - 35 - 71	00	70	None
0480		771 - 35 - 72	00	70	None
0480		771 - 36 - 5	00	00	None
0480		771 - 39 - 10	00	00	None
0480		774 - 1 - 7	00	00	None
0480		774 - 2 - 16	00	00	None
0480		774 - 4 - 5	00	00	None
0480		776 - 3 - 4	00	00	None

IDC	BWR Subpopulation	WSRIC Waste Stream	RCRA CCC	Non-RCRA CCC	EPA Hazardous Waste Numbers
0480		776 - 13 - 47	00	00	None
0480		776 - 14 - 38	00	00	None
0480		777 - 23 - 8	00	00	None
0480		776_777 - 1 - 3	00	00	None
0480		776_777 - 1 - 7	00	00	None
0480		776_777 - 5 - 6	00	00	None
0480		776_777 - 5 - 7	00	00	None
0480		776_777 - 5 - 24	00	00	None
0480		776_777 - 6 - 26	00	00	None
0480		776_777 - 6 - 125	00	07	None
0480		776_777 - 6 - 133	00	0770	None
0480		776_777 - 7 - 1	00	00	None
0480		776_777 - 9 - 9	00	00	None
0480		776_777 - 11 - 6	00	00	None
0480		779 - 2 - 2	00	00	None
0480		779 - 10 - 10	00	00	None
0480		779 - 14 - 6	00	00	None
0480		779 - 28 - 13	00	00	None
0480		779 - 37 - 15	00	00	None
0480		779 - 40 - 17	00	00	None
0480		779 - 40 - 18	00	00	None
0480		779 - 40 - 114	00	07	None
0480		886 - 2 - 14	00	00	None
0480		991 - 1 - 7	00	00	None
0480		D&D - 3 - 10	00	00	None
0480		D&D - 3 - 11	00	00	None
0480		D&D - 3 - 12	00	24	None
0480		D&D - 3 - 48	00	70	None
0480		D&D - 3 113	00	70	None
0480		D&D - 3 114	00	70	None
0480	24B		00	00	None
0480	24D		00	00	None
<i>Leach Light Metal</i>					
0481	24O		00	00	None
<i>TRU Light Metal</i>					
0824	24U		00	00	None

## Radionuclides

The determination of radionuclides contained in the waste is based on the IDC and the material balance area (MBA) in which the waste originated. The first table summarizes the radionuclides present based on the assigned IDC and can be used for all TRU metal debris wastes. The second table summarizes the radionuclides present in the waste based on the generation location. The generation location was determined from the prefix of the container identification number. The

prefix corresponds to an MBA historically used to track the movement of special nuclear material. Since the Site is no longer in production, the second table is only applicable for certain IDCs generated before 1992 which have not been treated and/or repackaged.<sup>(3)</sup>

IDC	Radionuclides <sup>1,2,3</sup>	Rationale
197	WG Pu, EU	IDC generated by Building 777 coatings, which coated substrates with plutonium and enriched uranium (and non-radioactive metals).
320	WG Pu, Am-241, DU, EU, Np-237, U-233 <sup>4</sup>	IDC generated in every TRU building; radionuclides dependent on generation process.
479	WG Pu	Transfer cans were used in plutonium recovery areas.
480	WG Pu, Am-241, DU, EU, Np-237, U-233 <sup>4</sup>	IDC generated in nearly every TRU building; radionuclides dependent on generation process.
824		
481	WG Pu, Am-241, DU, EU, Np-237, U-233	IDC generated from washing of metals originating from any process within the PA.

Key: WG Pu weapons-grade plutonium  
Am-241 americium-241  
DU depleted uranium  
EU enriched uranium  
Np-237 neptunium-237  
U-233 uranium-233

Notes:

1. Only waste generated before 1986 may contain Np-237 because processing of this material was discontinued at this time.
2. Only waste generated before 1983 may contain U-233 because processing of this material was discontinued at this time.
3. Am-241 is indicated only for IDCs (unless notes otherwise) in which americium operations were performed (e.g., molten salt extraction). Am-241 is not indicated if it is expected to be present only due to plutonium-241 decay.
4. For backlog wastes (generated before 1992) that have not been treated and/or repackaged, radionuclides can also be determined based on the container prefix listed in the following table.

Building	Prefix	Prefix Description	Potential Radionuclides
<b>Building 371</b>			
371	0017	Residue Repack, Rm. 3602	Note 1
371	0032	Aqueous Recovery	WG Pu, Am-241
371	0034	Aqueous Recovery	WG Pu, Am-241
371	0039	DCHP Preparation	WG Pu
371	0043	Stacker Drums	Note 1
371	0071	Analytical/Standards Laboratory	WG Pu, EU, DU, Am-241
371	0073	Aqueous Recovery	WG Pu, Am-241
371	0076	Repackaging Residues/PBA's	Note 1
371	0092	Aqueous Recovery	WG Pu, Am-241

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Building	Prefix	Prefix Description	Potential Radionuclides
371	0093	Aqueous Recovery	WG Pu, Am-241
<i>Building 374</i>			
374	0749	Liquid Waste Operations	WG Pu, EU, DU, Am-241
<i>Building 559</i>			
559	0029	Analytical Lab, Production Support	WG Pu, EU, DU, Am-241
<i>Building 707</i>			
707	0012	Metallurgy Operations, Casting	WG Pu, Am-241, EU <sup>3</sup>
707	0015	Metal Fabrication, Part V	WG Pu
707	0022	Metal Fabrication, Machining	WG Pu
707	0031	Metallurgy Fabrication Assembly	WG Pu
<i>Building 771</i>			
771	0002	Aqueous Recovery	WG Pu, EU, DU, Am-241
771	0005	Building 771 Second Floor Construction	WG Pu
771	0009	Plenums	WG Pu, EU, DU, Am-241
771	0037	Analytical Laboratory	WG Pu, EU, DU, Am-241
771	0038	Chemical Standards Laboratory	WG Pu, EU, DU, Am-241
771	0042	Chemical Technology	WG Pu, EU, DU, Am-241
771	0074	EU Leach	EU, WG Pu
771	0078	Plutonium Metallurgy Development	WG Pu, EU, DU, Am-241
<i>Building 776</i>			
776	0003	Pyrochemical Operations	WG Pu, Am-241, EU
776	0019	Size Reduction	Note 1
776	0025	Drum Repack	Note 1
776	0057	Advanced Size Reduction	Note 1
776	0075	Waste Process Development	WG Pu
776	0776	Generation Prefix for Bldg. 776	Note 2
776	9069	Prefix 9069	Note 2
<i>Building 777</i>			
777	0016	Production Control Coatings Development	WG Pu, EU
777	0021	Metallography Laboratory	WG Pu, EU, DU, Am-241
777	0023	Metal Fabrication Machining Development	WG Pu, EU, Am-241 <sup>4</sup>
777	0024	Metallurgy Fabrication Disassembly	WG Pu, EU
777	0066	Special Assembly Projects	WG Pu, EU, DU, Am-241
<i>Building 779</i>			
779	0052	Pyrochemistry Technology Process Development	WG Pu, Am-241, EU
779	0054	R & D Residue Drums	WG Pu, EU, DU, Am-241
779	0055	Hydride Operation. Rooms 152A/160A	WG Pu
779	0077	Product Physical Chemistry VTR	WG Pu, EU, DU
<i>Building 881</i>			
881	881A	Generation Prefix for Bldg. 881	Note 2
881	881C	Generation Prefix for Bldg. 881	Note 2
<i>Building 886</i>			
886	0081	Nuclear Safety	WG Pu, EU
886	0084	Not Defined	Note 2



Key: WG Pu weapons-grade plutonium  
EU enriched uranium  
DU depleted uranium  
Am-241 americium-241

Notes:

1. Wastes assigned these prefixes originated from other areas or were generated during repackaging of wastes from other areas. The repackaged containers were assigned the prefix for the area where the wastes were repackaged. The source of these wastes is difficult to determine and may include any radionuclides processed on plant site.
2. These prefixes have not been assessed for potential radionuclides. Radionuclide contaminants will be determined at assay.
3. Am-241 (above ingrowth) and U-235 were detected by radioassay in backlog wastes from Building 707, prefix 12. These radionuclides were not anticipated based on acceptable knowledge, but are being added for waste generated before 1992 from prefix 12 because of these results.
4. Am-241 (above ingrowth) was detected by radioassay in backlog wastes from Building 777, prefix 23. This radionuclide was not anticipated based on acceptable knowledge, but is being added for wastes generated before 1992 from prefix 23 because of these results.

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2. DOE 1995. Transuranic Waste Baseline Inventory Report, Revision 2. DOE/CAO-95-1121.
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5. RFETS 1999. Backlog Waste Reassessment Baseline Book, Waste Form 24, Metal.
6. Waste and Environmental Management System (WEMS) database.
7. RMRS 1999. Interoffice Memorandum from Jeff Harrison to TWCP Records. JLH-009-1999. November 1.
8. K-H 1999. Kaiser-Hill Interoffice Memorandum from K. P. Ferrera to G. A. O'Leary. KPF-014-99. April 15.
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10. RFETS 1999. Waste Stream and Residue Identification and Characterization Building 707, Version 6.0.